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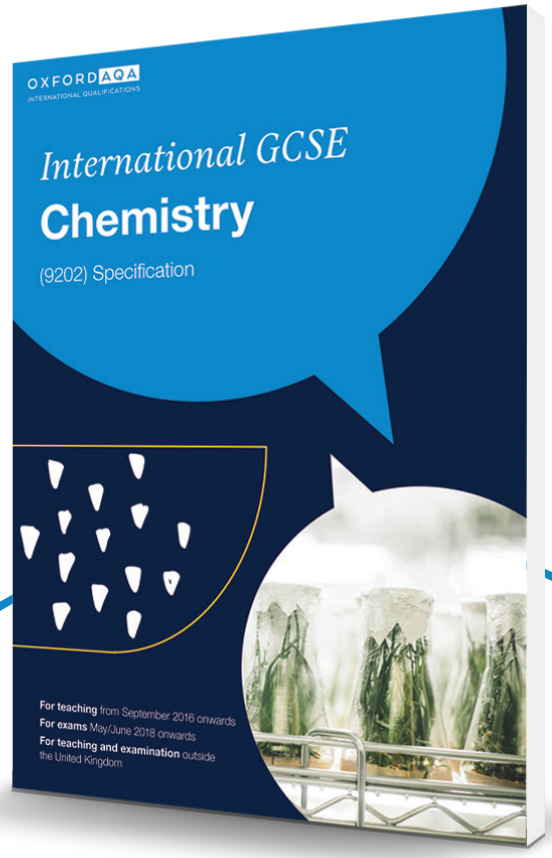
Switching Guide

International GCSE
Chemistry
(9202)



Switching from Pearson Edexcel or Cambridge International to OxfordAQA International Qualifications

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INTERNATIONAL QUALIFICATIONS

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Switching to OxfordAQA International GCSE Chemistry (9202)

For this **OxfordAQA International GCSE Chemistry** specification, OxfordAQA have blended the best of the AQA specification, which is the most popular specification in England, with ideas, concepts and approaches to learning which make it appropriate for international schools.

Rigorously aligned to the UK standard, students gain a broad foundation in Chemistry and scientific working, with exams that test subject ability not English proficiency.

Teachers will see this as the ideal choice for students who want to study and excel in chemistry at GCSE level and progress to further study.

Key features:

- Students are assessed fairly, with papers carefully designed to avoid cultural or linguistic bias.
- Practical components are flexible around local access to equipment and materials, with practical knowledge assessed through the main exam papers.
- Carefully developed in alignment with the reformed UK GCSE Chemistry standard to ensure reliability.

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Topic by topic comparison

OxfordAQA specification (9202) v5.2	Pearson Edexcel specification (4CH1)	Cambridge International specification (0971)
Overall structure		
Ten topics: 1. Atomic structure and the periodic table 2. Structure, bonding and the properties of matter 3. Chemical changes 4. Chemical analysis 5. Acids, bases and salts 6. Quantitative chemistry 7. Periodicity 8. The rate and extent of chemical change 9. Energy changes 10. Organic chemistry	**Four topics:** 1. Principles of chemistry 2. Inorganic chemistry 3. Physical chemistry 4. Organic chemistry	**Fourteen topics:** 1. The particulate nature of matter 2. Experimental techniques 3. Atoms, elements and compounds 4. Stoichiometry 5. Electricity and chemistry 6. Chemical energetics 7. Chemical reactions 8. Acids, bases and salts 9. The Periodic Table 10. Metals 11. Air and water 12. Sulfur 13. Carbonates 14. Organic chemistry

OxfordAQA specification (9202) v5.2	Pearson Edexcel specification (4CH1)	Cambridge International specification (0971)
All candidates sit two exams Each exam is 90 minutes in length, which are equally weighted. Both papers assess content from the whole of the specification. Paper 1 has more of a focus on recall, with Paper 2 being more focused on application and evaluation. The exams are not tiered and cover grades 9–1, with 9 being the highest. There is no 'extension' material in the specification; all students are expected to have covered all content. There is a mixture of different question styles, including multiple-choice questions, short-answer questions, calculations and extended open-response questions.	**All candidates sit two exams** Paper 1 is 120 minutes/110 marks which assesses core content common to the Pearson Edexcel GCSE in Double Science (worth 61.1% of the marks for this qualification). Paper 2 is 75 minutes/70 marks, assesses all the content including content which is unique to the GCSE in Chemistry (worth 38.9% of the marks for this qualification). The exams are not tiered and cover grades 9–1, with 9 being the highest. There is a mixture of different question styles, including multiple-choice questions, short-answer questions, calculations and extended open-response questions.	**All candidates take three papers** Candidates who have studied Core subject content are eligible for grades 1 to 5 and should be entered for Paper 1, Paper 3 and either Paper 5 or Paper 6. Candidates who have studied Extended subject content (Core and Supplement) are eligible for grades 1 to 9 and should be entered for Paper 2, Paper 4 and either Paper 5 or Paper 6. Paper 1 and Paper 2 are multiple choice papers, 40 marks/45 minutes and count for 30% of total marks. Paper 3 and Paper 4 have short answer and structured questions, 80 marks/75 minutes and count for 50% of total marks. Paper 5 is a practical test, 40 marks/75 minutes and counts for 20% of total marks. Paper 6 is an alternative to practical paper, 40 marks/60 minutes, and 20% of total marks. All candidates should be taught the core subject content. Candidates aiming for higher grades should also be taught the extended subject content.

OxfordAQA specification (9202) v5.2	Pearson Edexcel specification (4CH1)	Cambridge International specification (0971)
Practical is assessed in the written papers. There is no separate practical exam. Experimental work is described in the main body of the specification and the appendix gives details of the experimental and investigative skills that students should be encouraged to develop during the course. There are five required practical activities. These are described in detail in a separate practical handbook. Required practicals: 1. Investigate the products at the anode and cathode in the electrolysis of copper sulfate solution. 2. Identify the metal ion in an unknown compound using flame testing techniques. 3. Establish the concentration of an unknown strong acid through titration with a strong base. 4. Investigate factors affecting the rate of a reaction. 5. Test for the presence of a double bond in an unknown hydrocarbon.	**Experimental skills are assessed through the written exams.** Students develop knowledge and understanding of experimental skills through the context of the chemistry they are learning. Experimental work is described in the specification. The appendix contains a list of 26 additional practical investigations that can be used to supplement students' understanding of chemistry in addition to the practical investigations found within the main body of the content.	**Students should carry out practical work and investigations within the topics listed in the specification.** Experimental skills tested in paper 5 and paper 6 are: • Simple quantitative experiments involving the measurement of volumes and/or masses Rates (speeds) of reaction • Measurement of temperature based on a thermometer with 1°C graduations • Problems of an investigatory nature, possibly including suitable organic compounds • Filtration • Electrolysis • Identification of ions and gases
Content	**Coverage**	**Coverage**
3.1 Atomic structure and the periodic table		
3.1.1 Solids, liquids and gases	**1(a) States of matter** The content is covered in Edexcel is broadly similar but there is more emphasis on solubility and the use of solubility curves plus an experiment to investigate the solubility of a solid.	**1.1 The particulate nature of matter** The coverage is similar, although OxfordAQA require students to be familiar with particular diffusion experiments. The Cambridge International specification includes Brownian motion, which is not included in OxfordAQA. OxfordAQA does not require candidates to describe the pressure and temperature of a gas in terms of the motion of its particles. **7.1 Physical and chemical changes** This topic is not included in the OxfordAQA specification.

OxfordAQA specification (9202) v5.2	Pearson Edexcel specification (4CH1)	Cambridge International specification (0971)
3.1.2 A simple model of the atom	**1(c) Atomic structure** The coverage is similar but Edexcel includes the calculation of relative atomic mass from relative abundances, which is not included in OxfordAQA specification.	**3.1 Atomic structure and the Periodic Table** The content is similar. The OxfordAQA specification refers to mass number as the sum of protons and neutrons and the term nucleon is only used in the Cambridge International specification. Only Cambridge International refers to radioactive and non-radioactive isotopes and includes the uses of isotopes.
3.1.3 The Periodic Table	**1(d) The Periodic Table** Although the content is similar, Edexcel includes the use of electrical conductivity and the acid-base character of oxides to classify elements as metals or non-metals.	**9.1 The periodic table** **9.2 Periodic trends** **9.5 Noble gases** The content is similar but Cambridge International places more emphasis on the metallic and non-metallic character of the elements and also includes the uses of noble gases
3.2 Structure, bonding and the properties of matter		
3.2.1 Chemical bonds: ionic, covalent and metallic 3.2.2 How bonding and structure are related to he properties of substances 3.2.3 Structure and bonding of carbon	**1(f) Ionic bonding** The content is similar but the Edexcel specification is more explicit about which dot-and-cross diagrams students need to be able to draw. **1(g) Covalent bonding 1(h) Metallic bonding** The content is very similar although OxfordAQA is more explicit in the different methods for representing covalent and metallic bonding in pictorial form. Both specifications include the structure and properties of diamond, graphite and fullerene but the OxfordAQA specification goes a little further by mentioning delocalised electrons in graphite. Edexcel does not include silicon dioxide as an example of a giant covalent structure.	**3.2.1 Bonding: the structure of matter** **3.2.2 Ions and ionic bonds** **3.2.3 Molecules and covalent bonds** **3.2.4 Macromolecules** **3.2.5 Metallic bonding** The content is very similar. The Cambridge International specification limits the description of ionic bonding to the combination of Group 1 and Group 7 elements. The OxfordAQA specification is more explicit in the different methods for representing covalent and metallic bonding in pictorial form.

OxfordAQA specification (9202) v5.2	Pearson Edexcel specification (4CH1)	Cambridge International specification (0971)
		The Cambridge International specification states that students should be able to describe the giant covalent structures of diamond and graphite but there is less detail about what is required, Cambridge International does not include the reason for the electrical conductivity of graphite and it does not mention fullerenes.
3.2.4 Nanoparticles	This topic is not included in the Edexcel specification.	This topic is not included in the Cambridge International specification.
3.3 Chemical changes		
3.3.1 Metals	**Topic 1(h) Metallic bonding** Edexcel contains the word 'malleability', whereas OxfordAQA makes reference only to 'bent or hammered into shape'. This section of the OxfordAQA specification includes alloys which are covered in Edexcel Topic 2(e). The Edexcel specification is more explicit about why alloys are harder than pure metals.	**10.1 Properties of metals** The content is similar but the OxfordAQA specification is more explicit about the properties of metals and the definition of an alloy. **10.4 Uses of metals** Both specifications include the properties and uses of copper but OxfordAQA has much less detail about the uses of aluminium, steel and zinc.

OxfordAQA specification (9202) v5.2	Pearson Edexcel specification (4CH1)	Cambridge International specification (0971)
3.3.1.1 The reactivity series	**2(d) Reactivity series** Edexcel includes displacement reactions between metals and metal oxides and between metals and aqueous solutions of metal salts. OxfordAQA only includes metals and aqueous solutions. Edexcel includes the conditions for rusting and the prevention of rusting but this is not included in the OxfordAQA specification. Both specifications include the reactions of metals with water and acid. **2(e) Extraction and uses of metals** There is more detail in the OxfordAQA specification regarding the extraction of particular metals. This includes an outline of the reactions involved in the production of iron in the blast furnace and the extraction of copper by phytomining and bioleaching. OxfordAQA places more emphasis on the recycling of metals.	**10.2 Reactivity series** Cambridge International includes displacement reactions between metals and metal oxides and between metals and aqueous solutions of metal salts. OxfordAQA only includes metals and aqueous solutions. There are other differences: OxfordAQA includes lithium in the reactivity series and mentions the unreactivity of gold. Only Cambridge International includes the apparent unreactivity of aluminum and the prevention of rusting. Rusting is included in Cambridge International Topic 11.2. Cambridge International includes the effect of heat on nitrates, hydroxides and carbonates but OxfordAQA only includes carbonates (Topic 3.3.1.2). **10.3 Extraction of metals** There are some differences: Cambridge International includes the extraction of zinc from zinc blende whereas OxfordAQA includes copper extraction by phytomining and bioleaching.
3.3.1.2 Metal carbonates	The same content is covered in **2(c)** and **2(g)** of the Edexcel specification	**13.1 Carbonates** OxfordAQA includes the decomposition of carbonates but not nitrates and hydroxides. Also OxfordAQA does not include the uses of calcium carbonate, lime and slaked lime. The production of carbon dioxide from the decomposition of carbonates and the reaction of acids and carbonates also appears in Cambridge International Topic 11.4.

OxfordAQA specification (9202) v5.2	Pearson Edexcel specification (4CH1)	Cambridge International specification (0971)
3.3.2 Electrolysis	**1(i) Electrolysis** Much of the content is the same. OxfordAQA also includes the effect of reactivity and concentration on which ion is discharged during electrolysis. OxfordAQA includes electroplating which only appears in Edexcel as a suggested practical investigation. OxfordAQA includes the industrial extraction of aluminium and the uses of the products of the electrolysis of sodium chloride solution. The electrolysis of copper sulfate solution is a required practical. Edexcel requires candidates to investigate the electrolysis of aqueous solutions including sodium chloride solution, copper sulfate solution and dilute sulfuric acid.	**5.1 Electricity and chemistry** The coverage is very similar. Cambridge International lists additional electrolytes: concentrated hydrochloric acid and dilute sulfuric acid. Investigating the products of the electrolysis of copper sulfate solution is an OxfordAQA required practical. The production of electrical energy from simple cells is covered in Cambridge International Topic 5.1 (Electricity and chemistry).
3.4 Chemical analysis		
3.4.1 Purity and chromatography	**1(b) Elements, compounds and mixtures** The content is very similar. Both specifications refer to chromatography experiments and the use of R_f values.	**2.2.1 Criteria of purity** **2.2.2 Methods of purification** The content is similar. The OxfordAQA specification does not include locating agents but does require students to know that solvents other than water can be used for paper chromatography.

OxfordAQA specification (9202) v5.2	Pearson Edexcel specification (4CH1)	Cambridge International specification (0971)
3.4.2 Identification of common gases	**2(h) Chemical tests** Both specifications include tests for the same five gases. **2(c) Gases in the atmosphere** Much of this topic goes beyond what is required by the OxfordAQA specification. Percentages of gases in the air, combustion of elements in oxygen and a practical to determine the percentage of oxygen in the air does not appear in OxfordAQA. However, thermal decomposition of metal carbonates and carbon dioxide as a greenhouse gas does appear in OxfordAQA in Topics 3.3.1.2(a) and 3.10.1.2(d).	**8.4 Identification of gases** Both specifications include tests for the same five gases but Cambridge International also includes the test for sulfur dioxide using aqueous potassium manganate(VII).
3.4.3 Identification of ions	**2(h) Chemical tests** Both specifications include the identification of five positively charged ions using flame tests and this is one of the OxfordAQA required experiments. There are four ions in common but OxfordAQA has barium ions instead of copper ions. OxfordAQA includes the tests for six different positively charged ions using sodium hydroxide solution but does not include ammonium ions. Edexcel includes copper, iron(II) and iron(III) but not aluminum, calcium and magnesium ions. Both specifications include tests for the same five negatively charged ions. Both specifications include the effect of water on anhydrous copper sulfate but this is in Topic 3.9.1 (Exothermic and endothermic reactions) in the OxfordAQA specification.	**8.4 Identification of ions** Both specifications include the identification of positively charged ions using flame tests and this is one of the OxfordAQA required experiments. Cambridge International only requires four ions including copper but not calcium and barium. Both specifications include tests for positively charged ions using sodium hydroxide solution. OxfordAQA includes magnesium ions but does not include ammonium, chromium and zinc ions. Both specifications include the tests for five different negatively charged ions but Cambridge International also includes the test for nitrite and sulfite ions.

OxfordAQA specification (9202) v5.2	Pearson Edexcel specification (4CH1)	Cambridge International specification (0971)
3.5 Acids, bases and salts		
3.5.1 The properties of acids and bases	**2(f) Acids, alkalis and titrations** The OxfordAQA specification names universal indicator and litmus but the Edexcel specification also requires a description of the use of phenolphthalein and methyl orange. Both specifications require students to be able to describe how to carry of an acid-base titration. This is one of the OxfordAQA required experiments and it appears in Topic 3.6.4 (Molar concentrations). Edexcel includes the definition of an acid as a proton donor and base as a proton acceptor whereas OxfordAQA emphasises the role of hydrogen ions and hydroxide ions in solution and includes the ionic equation for neutralisation.	**8.1 The characteristic properties of acids and bases** There are some differences. Cambridge International defines acids and bases in terms of proton transfer and OxfordAQA emphasises the role of hydrogen ions and hydroxide ions in solution. Both specifications refer to the measurement of pH using universal indicator but Cambridge International also refers to litmus and methyl orange and the reaction of bases with ammonium salts. Cambridge International includes the meaning of weak and strong acids and bases and OxfordAQA also refers to weak acids not ionising completely in Topic 3.10.3.2 (Carboxylic acids) Only OxfordAQA includes the ionic equation for neutralisation. **8.2 Types of oxides** The classification of oxides as acidic or basic is not included in the OxfordAQA specification.
3.5.2 Preparation of salts	**2(g) Acids, bases and salt preparations** The content in both specifications is very similar but Edexcel includes the solubility rules for salts and is more explicit about which salts should be prepared by students: soluble copper sulfate and insoluble lead sulfate.	**8.3 Preparation of salts** The content in Cambridge International and OxfordAQA is very similar.

OxfordAQA specification (9202) v5.2	Pearson Edexcel specification (4CH1)	Cambridge International specification (0971)
3.6 Quantitative chemistry		
3.6.1 Conservation of mass including the quantitative interpretation of chemical equations 3.6.2 Use of amount of substance in relation to masses of pure substances 3.6.3 The mole concept 3.6.4 Molar concentrations	**1(e) Chemical formulae, equations and calculations** There are some differences. OxfordAQA does not include: • The experimental determination of the formulae of salts containing water of crystallisation. • Percentage yield calculations. • The determination of the formula of a metal oxide using combustion. Edexcel does not include the relative mass comparison with the carbon-12 isotope, use of the Avogadro constant and reasons why it may not be possible to obtain 100% yield during an experiment. Both specifications include acid-base titrations and this is an OxfordAQA required experiment.	**4.1 Stoichiometry** **4.2 The mole concept** Coverage is similar but OxfordAQA does not include percentage yield and percentage purity calculations. Although the Cambridge International specification includes the calculation of solution concentrations there is no specific mention of acid-base titrations whereas establishing the concentration of an unknown strong acid through titration with a strong base is an OxfordAQA required experiment.
3.7 Trends within the periodic table		
3.7.1 Group properties	**2(a) Group 1 (alkali metals)** **2(b) Group 7 (halogens)** The content in Edexcel is similar but OxfordAQA does not require knowledge of the colours and physical states of Group 7 elements. OxfordAQA gives more detail about how students are expected to explain the relative reactivities of Group 1 and Group 7 elements.	**9.3 Group properties** The content is similar but in Cambridge International the emphasis is on describing trends and OxfordAQA places much more emphasis on explaining the the relative reactivities of Group 1 and Group 7 elements.

OxfordAQA specification (9202) v5.2	Pearson Edexcel specification (4CH1)	Cambridge International specification (0971)
3.7.2 Transition metals	This content is not covered in the Edexcel specification. The OxfordAQA specification compares the melting point, density, strength, hardness and reactivity of the transition metals with Group 1 metals, as well as listing typical properties: ions with different charges, coloured compounds, and useful catalysts.	**9.4 Transition elements** Both specifications list the same properties of transition elements. OxfordAQA describes transition metal having ions with different charges but Cambridge International uses the term variable oxidation states. Unlike OxfordAQA, Cambridge International does not compare transition metals with Group 1 elements.
3.8 The rate and extent of chemical change		
3.8.1 Rate of reaction .	**3(b) Rates of reaction** The coverage is similar but the OxfordAQA specification includes two formulas which can be used for quantifying the rate of a reaction and requires students to interpret graphs of product formed with time. Edexcel includes experiments to investigate the effect of changing the size of marble chips and the concentration of hydrochloric acid on the rate of reaction also the effect of different solids on the catalytic decomposition of hydrogen peroxide. In contrast, the OxfordAQA required experiment is investigating the rate of reaction between sodium thiosulfate solution and dilute hydrochloric acid.	**7.2 Rate of reaction** The content is similar but only Cambridge International includes: • Explosive combustion with fine powders and gases • The role of light in photochemical reactions including photosynthesis • The use of silver salts in photography There is an emphasis in Cambridge International on using a practical method for the measurement of rate which involves gas evolution and the OxfordAQA specification includes two formulas which can be used for quantifying the rate of this type of reaction. However, the OxfordAQA required practical is the measurement of the rate of reaction between sodium thiosulfate solution and dilute hydrochloric acid.

OxfordAQA specification (9202) v5.2	Pearson Edexcel specification (4CH1)	Cambridge International specification (0971)
3.8.2 Factors affecting equilibrium 3.8.3 Production of ammonia and sulfuric acid	**3(c) Reversible reactions and equilibria** Both specifications include the dehydration of hydrated copper sulfate (this is covered in OxfordAQA Topic 3.9.1) but Edexcel also includes the effect of heat on ammonium chloride. Both specifications include the factors affecting equilibrium but OxfordAQA also includes more detailed examples from the Haber Process and the manufacture of sulfuric acid.	**7.3 Reversible reactions** Both specifications include the effect of heat and water on hydrated and anhydrous copper sulfate (This is covered in OxfordAQA Topic 3.9.1) but Cambridge International also includes cobalt(II) chloride. Both specifications require candidates to have knowledge of the factors that affect the position of equilibrium but the OxfordAQA specification includes more detail about what candidates need to know. **11.3 Nitrogen and fertilisers** In the specification supplementary content Cambridge International states that students should be able to describe and explain the conditions for the manufacture of ammonia. The OxfordAQA specification gives more detail about what students are expected to know about the Haber process. However, OxfordAQA does not mention phosphorus or potassium containing fertiliser. **12.1 Sulfur** In the specification supplementary content Cambridge International states that students should be able to describe the manufacture of sulfuric acid. The OxfordAQA specification gives more detail about what students should know about the reactions and conditions in the contact process. OxfordAQA does not include the uses of sulfur dioxide as bleach.

OxfordAQA specification (9202) v5.2	Pearson Edexcel specification (4CH1)	Cambridge International specification (0971)
3.8.4 Redox reactions	Redox reactions appear in Topic 2(d) of the Edexcel specification. Treatment is similar but the term reducing agent does not appear in the OxfordAQA specification.	**7.4 Redox** Both specifications define oxidation and reduction in terms of loss or gain of oxygen or electrons but Cambridge International also includes changes in oxidation state and colour in reactions involving potassium manganate(VII) and potassium iodide. Cambridge International requires candidates to identify oxidising agents and reducing agents from equations but the term reducing agent does not appear in the OxfordAQA specification.
3.9 Energy change		
3.9.1 Exothermic and endothermic reactions 3.9.2 Calculating and explaining energy change	**3(a) Energetics** The content of the Edexcel and OxfordAQA specifications is very similar. Only the OxfordAQA specification states that students should be able to give examples of exothermic and endothermic reactions.	**6.1 Energetics of a reaction** The content of the Cambridge International and OxfordAQA specifications is very similar. **6.2 Energy transfer** OxfordAQA includes simple calorimetry experiments, calculation of experimental energy changes and delta H conventions but this content does not appear in the Cambridge International specification. The Cambridge International specification describes uranium-235 as a source of energy but the uses of radioactive isotopes are not included in the OxfordAQA specification. **11.1 Water** Both specifications include the effect of heat and water on hydrated and anhydrous copper sulfate but only Cambridge International includes cobalt(II) chloride. OxfordAQA does not include the treatment of water or the large scale uses of water.

OxfordAQA specification (9202) v5.2	Pearson Edexcel specification (4CH1)	Cambridge International specification (0971)
3.9.3 Chemical cells and fuel cells	This content is not included in the Edexcel specification.	The production of electrical energy from simple cells is covered in Topic 5.1 (Electricity and chemistry). Cambridge International has less detail about fuel cells which are mentioned in Topic 6.2 (Energy transfer).
3.10 Organic chemistry		
3.10.1.1 Crude oil 3.10.1.2 Hydrocarbons	**4(a) Introduction to organic chemistry** Edexcel requires students to name organic compounds with up to six carbon atoms but OxfordAQA only names of compounds with up to three carbon atoms. The Edexcel specification uses the terms structural formula, displayed formula and isomer but OxfordAQA refers only to the term displayed structure and does not include structural isomerism. Also OxfordAQA does not use the terms substitution reaction and addition reaction. 4(b) Crude oil. The Edexcel specification requires students to know the names of the main fractions of crude oil. Also Edexcel goes into more detail about the poisonous effects of carbon monoxide and the formation of oxides of nitrogen during combustion. The cracking of alkanes is included in Topic 3.10.10.3 of the OxfordAQA specification. OxfordAQA has a section on biofuels and the production of ethanol by fermentation. Edexcel does not cover biofuels and the production of ethanol is covered in Topic 4(e). **4(c) Alkanes** Edexcel includes the reactions of alkanes with halogens but this is not included in the OxfordAQA specification.	**14.1 Names of compounds** The content is similar. Cambridge International requires structural formulae but OxfordAQA also includes displayed structures. **14.2 Fuels** The OxfordAQA specification does not expect students to know the names and uses of the fractions of crude oil. **14.3 Homologous series** The content is similar but OxfordAQA does not include structural isomerism. **14.4 Alkanes** Cambridge International only mentions methane and ethane. OxfordAQA goes up to propane but does not include substitution reactions with chlorine. **11.2 Air** Both specifications cover air pollution in similar depth but OxfordAQA does not include the composition of air or the separation of liquid air by fractional distillation. OxfordAQA does not include lead pollution or the effects of air pollution on health and buildings and OxfordAQA does not include rusting or methods of rust prevention. 11.4 Carbon dioxide and methane.

OxfordAQA specification (9202) v5.2	Pearson Edexcel specification (4CH1)	Cambridge International specification (0971)
		The OxfordAQA specification includes most of the content of this topic in another part of the specification (Topic 3.3.1.2) but it does not include the production of carbon dioxide by respiration, the production of methane from living things or the carbon cycle. Although fermentation is included in Topic 14.6, biofuels are not included in the Cambridge International specification.
3.10.1.3 Obtaining useful substances from crude oil	**4(d) Alkenes** The Edexcel specification covers catalytic cracking in Topic 4(b) Both specifications include the reaction with bromine water and this is one of the OxfordAQA required experiments. Edexcel also includes the reaction with bromine to produce dibromoalkanes.	**14.5 Alkenes** Both specifications include the reaction of alkenes with bromine water and this is an OxfordAQA required practical. OxfordAQA does not include addition reactions with bromine, hydrogen and steam.
3.10.2 Synthetic and naturally occurring polymers	**4(h) Synthetic polymers** Both specifications include poly(ethene) and poly(propene) but Edexcel also expects students to understand how to draw the repeat unit for poly(chloroethene) and poly(tetrafluoroethene). Both specifications focus on non-biodegradability and disposal problems but Edexcel also includes the production of toxic gases when some polymers are burned. OxfordAQA only deals with addition polymerisation but Edexcel includes condensation as well (polyesters) and requires students to understand how to write the displayed formula of a polyester. Edexcel mentions biodegradable polymers but OxfordAQA is more specific about biodegradable polymers made from cornstarch.	**14.8 Polymers** Cambridge International states that candidates should be able to explain the difference between addition and condensation polymers. The formation of poly(ethene) is mentioned in Topic 14.5. OxfordAQA covers only the addition polymers poly(ethene) and poly(propene) and requires students to explain the behaviour of thermosoftening polymers. OxfordAQA does not include the condensation polymers nylon and terylene. OxfordAQA does not include the natural polymers protein and carbohydrate. Both specifications mention the non-biodegradability of polymers but OxfordAQA goes into more detail about the problems this causes and it also mentions biodegradable plastics made from cornstarch.

OxfordAQA specification (9202) v5.2	Pearson Edexcel specification (4CH1)	Cambridge International specification (0971)
	OxfordAQA has a section on thermosoftening and thermosetting polymers but this topic is not included in the Edexcel specification.	
3.10.3.1 Alcohols	**4(e) Alcohols** OxfordAQA only mentions the first three members of the homologous series but Edexcel also includes butanol. Both specifications cover the oxidation of alcohols but Edexcel also names the reagents. Both specifications cover the manufacture of ethanol from ethene and by fermentation – these reactions are covered in OxfordAQA Topic 3.10.1.2.	**14.6 Alcohols** The coverage is similar. The production of alcohol by fermentation and the reaction of ethene with steam is covered in OxfordAQA Topic 3.10.1.2.
3.10.3.2 Carboxylic acids	**4(f) Carboxylic acids** Coverage is similar. The OxfordAQA specification mentions that carboxylic acids do not ionise completely because they are weak acids.	**14.7 Carboxylic acids** The coverage is similar. The oxidation of ethanol to form ethanoic acid is covered in OxfordAQA Topic 3.10.3.1 but the specification does not name the oxidising agent. Although the Cambridge International specification states that ethanoic acid is a weak acid, the OxfordAQA specification goes further: carboxylic acids are weak acids because they do not ionise completely.
3.10.3.3 Esters	**4(g) Esters** Coverage is similar. Edexcel includes the preparation of an ester as a student practical.	The OxfordAQA specification gives ethyl ethanoate as an example of an ester. Cambridge International (Section 14.1) goes much further and requires extension candidates to name and draw the structural formulae of the esters which can be made from unbranched alcohols and carboxylic acids, each containing up to four carbon atoms.

Topics included in Pearson Edexcel but not in OxfordAQA	Topics included in OxfordAQA but not in Pearson Edexcel
Solubility rules and an experiment to investigate solubility	Explanation of electrical conductivity in graphite
Calculation of relative atomic mass	Silicon dioxide as an example of a giant structure Nanoparticles
Acid-base character of oxides	Chemistry of the extraction of iron in the blast furnace
Hardness of alloys	Extraction of copper by phytomining and bioleaching
Displacement reactions between metals and metal oxides	Flame test for barium ions
Prevention of rusting in iron	Chemical tests for aluminium, magnesium and calcium ions Ionic equation for neutralisation
Gases in the atmosphere and the percentage of oxygen in air	Weak acids do not ionise completely
Flame test for copper ions	Comparison with the carbon-12 isotope
Test for ammonium ions	The Avogadro constant
Use of phenolphthalein and methyl orange	Reasons for less than 100% yield
Definition of an acid as a proton donor	Transition metals – comparison with Group 1
Percentage yield calculations	Calculating rate of reaction and interpreting rate graphs
The determination of the formula of a hydrated salt	The Haber process
The determination of the formula of a metal oxide using combustion	The manufacture of sulfuric acid
Colour and state of Group 7 elements	Chemical cells and fuel cells
The effect of heat on ammonium chloride	Biofuels
Structural isomerism	Thermosoftening and thermosetting polymers
Names of fractions obtained from crude oil	
Reactions of alkanes with halogens	
Condensation polymers	

Topics included in Cambridge International but not in OxfordAQA	Topics included in OxfordAQA but not in Cambridge International
Physical and chemical changes	Explanation of electrical conductivity in graphite
Brownian motion	Structure of fullerenes
Uses of radioactive isotopes	Nanoparticles
Displacement reactions between metals and metal oxides	Extraction of copper by phytomining and bioleaching
Prevention of rusting in iron	Flame tests for calcium and barium
Effect of heat on nitrates and hydroxides	Chemical test for magnesium ions
Extraction of zinc from zinc blende	Ionic equation for neutralisation
Test for sulfur dioxide and uses of sulfur dioxide	Weak acids do not ionise completely
Flame test for copper	Acid-base titrations
Chemical tests for ammonium, chromium and zinc	Calorimetry experiments
Test for nitrite and sulfite ions	Delta H conventions
Classification of oxides	Biofuels
Calculation of percentage yield	Examples of biodegradable plastics
Calculation of percentage purity	Thermosoftening and thermosetting polymers
Oxidation states	
Explosions, photochemical reactions and the use of silver salts in photography	
Water treatment	
Names and uses of the fractions obtained from crude oil	
Structural isomerism	
Reactions of alkanes with chlorine	
Composition of air and separation of liquid air by fractional distillation	
The carbon cycle	
Addition reactions of alkenes with hydrogen and steam	
Condensation polymers and natural polymers	

OXFORD AQA
INTERNATIONAL QUALIFICATIONS

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